Claim 1 has been rejected with regard to the manifolds being smoothly bent. Applicant has amended claim 1 to set forth that it is the flow paths in the manifold which are smoothly bent. A preferred embodiment of this feature can be seen in Figure 4 which shows the exit manifold 19. The outlet of the exit manifold is on the right side of Figure 4, and the joint ends of the exit manifold are on the left side of the manifold in Figure 4. The flow path from the joint end to the outlet of the exit manifold 19 is smoothly bent to change the flow path as it is received from the flow tube, and discharged out of the exit manifold 19.

Claim 1 has been rejected as being anticipated by Cage.

Applicant notes that claim 1 sets forth that the two flow tubes are curved into an arch shape having joint ends. The manifolds are further set forth in the claims as connected to the joint ends. Applicant has reviewed Cage, and finds no teaching nor suggestion of an arch shape with joint ends, especially where manifolds are connected to the joint ends. Instead Applicant finds Cage to have U-shaped tubes 130. Tubes 130 have straight legs which connect to mounting blocks 120. In the preferred embodiment of the present application drawings, the shape of the flow tubes 1 and 2 is clearly shown to be an arch ending at the joint ends where the flow tubes connect to the manifolds. It is quite clear that the reference of Cage does not describe an arch ending at joint ends where flow tubes connect to manifolds. Instead Cage clearly describes U-shaped tubes which have significant straight portions or legs that are parallel to each other on opposite sides of the U-shape. These straight sections or legs clearly do not have an arch shape. Therefore Cage does not have any description which would anticipate an arch shape having joint ends, where those joint ends are connected to manifolds. Cage fails to

anticipate all of the features of claim 1 and claim 1 defines over Cage.

New independent claim 5 sets forth that each of the flow tubes has a curve and that each curve forms an arch which extends fully from a respective first joint end to a respective second joint end. As described above, Cage does not teach nor suggest an arch extending fully from a first joint end to a second joint end, but instead Cage describes a U-shaped tube with straight sections or legs. Therefore the feature of the arch in claim 5 is also not taught nor suggested in Cage, especially with regard to an arch extending fully from one joint end to another joint end. Claim 5 therefore also defines over Cage.

As described in the present specification on page 2, first full paragraph, Coriolis flow meters of the type in Cage, and shown in Figure 5 of the present application, both suffer from the drawback that a large lateral space is needed in order to install this type of mass flow meter. By the present invention setting forth a Coriolis mass flow meter with arch shaped flow tubes instead of U-shaped flow tubes, the present invention does not need as much lateral space. Therefore the flow meter of the present invention can be installed in applications where there is very little lateral space. Furthermore, the present invention is beneficial in areas where space is very valuable since the flow meter of the present invention is less costly due to less valuable space being consumed.

Applicant further finds no incentive in Cage which would lead a person of ordinary skill in the art to modify the U-shaped tubes of Cage into arch shaped tubes. It appears that the flow meter of Cage relies on the straight sections or legs of the U-shape to operate properly, or at least to provide a significant contribution to determining a mass flow. Therefore Cage leads a

person away from an arch shaped flow tube. The present claims therefore cannot be considered obvious in view of Cage.

Claims 6 and 7 set forth further features of the arch with regard to the axial directions of the first and second joint ends. It is quite clear from the features of claims 6 and 7 that the flow tubes do not form a U-shape, but instead clearly form an arch shape. As described above, Cage does not describe an arch shape, and clearly describes a U-shape which would lead a person away from an arch shape, especially an arch shape having the features of claims 6 and 7. Claims 6 and 7 therefore further define over Cage.

Claim 11 sets forth that each curve is continuous from the first joint end to the second joint end. The straight sections in the U-shape of Cage clearly does not form a continuous curve from one end to another. Therefore claim 11 further defines over Cage.

Claim 2 has been rejected as being obvious over Cage in view of Zaschel. Applicant notes that claim 2, and new claim 8 sets forth a sealed pressure resistant case. Applicant has reviewed Zaschel, especially Figure 2 as described in the rejection. Element 38 of Zaschel is being equated with the sealed pressure resistant case of claim 2. Applicant notes that Figure 2 shows the element 38 spaced from the ends 28 and 29 in Zaschel. Therefore element 38 is not a sealed case. Claims 2 and 8 therefore define over Zaschel.

Claims 2 and 8 also set forth that the entry and exit manifolds are arranged in corners of the case. The rejection states that Zaschel teaches entry and exit manifolds installed at the ends of cylindrical portions passing through the corners as in Figure 2. Applicant has reviewed Figure 2, and finds no teaching nor suggestion of a manifold in Figure 2. The description of

Figure 2 sets forth a single measuring pipe 27. Furthermore Applicant notes that element 27 appears to be held by elements 34 and 36 which are not at ends. It appears that elements 34 and 36 are spaced from ends, and are certainly spaced from any corners. Claims 2 and 8 therefore further define over Cage and Zaschel.

Claims 3 and 4 have been rejected as being obvious over Cage in view of Zaschel and in view of Van Cleeve. The rejection states that Zaschel teaches a case that has an oval shape with the length of the major axis orientating the curve direction of the flow tubes. Applicant has reviewed Zaschel, and cannot find any indication that the shape of a case, or element 38, being an oval shape. Applicant notes that claim 3 sets forth that the length of major axis smoothly and gradually is reduced from the axial central part to both ends thereof. Applicant notes that element 38 in Zaschel does not smoothly reduce its cross-section from a central part to an end, but instead clearly has discontinuities. Therefore claim 3 further defines over the prior art.

Van Cleeve is used to describe a pair of integrally formed disc-shape flanges, and elements 103 of Van Cleeve are equated with the flanges of claim 3. Applicant notes that claims 3 and 9 set forth that the entry and exit manifolds have a pair of integrally formed disc-shaped flanges connected to the pressure case. Applicant has reviewed Van Cleeve, and notes that elements 103 are not part of a manifold and do not appear to be part of a pressure case. Therefore elements 103 of Van Cleeve cannot anticipate the flanges of the manifold forming part of the pressure case in claims 3 and 9. Claims 3 and 9 therefore further define over the prior art.

Van Cleeve is also used to disclose the use of temperature sensors for the purpose of correcting the output information of the flow sensor. Applicant notes that claim 4 sets forth a temperature sensor for compensating thermal effects of a distance between fixed ends on both sides of the flow tube. Claim 10 sets forth a first temperature sensor arranged on the pressure case and measurable of temperatures affecting a distance between the ends of the flow tubes. Applicant finds no teaching nor suggestion in Van Cleeve of measuring any temperatures which would affect a distance between ends of flow tubes. Therefore claims 4 and 10 further define over the applied prior art.

Since the applied prior art does not teach nor suggest all of the features of the claims, the claims are patentable in view of the prior art.

If the Examiner has any comments or suggestions which would further favorable prosecution of this application, the Examiner is invited to contact Applicant's representative by telephone to discuss possible changes.

At this time Applicant respectfully requests reconsideration of this application, and based on the above amendments and remarks, respectfully solicits allowance of this application.

Respectfully submitted
for Applicant,

By: _____

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MARKED-UP VERSION OF THE CLAIMS

1. (Amended) A Coriolis mass flow meter having two parallel flow tubes curved into an arch shape having joint ends, an entry-side manifold that is connected to one set of said joint ends of said two flow tubes and branches a fluid being measured from an inlet port into said two flow tubes, an exit-side manifold that is connected to another set of said joint ends of said two flow tubes and converges flows of said fluid being measured flowing in said two flow tubes into an outlet port to discharge said fluid being measured, a drive unit for driving and resonating ~~a~~one of said flow tubes with another of said flow tubes at mutually opposite phases, and a pair of oscillation sensors installed at locations horizontally symmetrical with respect to ~~the~~an installation location of said drive unit for sensing a phase difference proportional to a Coriolis force, said meter comprising;

said two flow tubes which are connected to the entry-side manifold and the exit-side manifold at the joint ends respectively, being formed into the arch shape that is bent in ~~a~~only one direction; and

said entry-side and exit-side manifolds being connected to said flow tubes at said joint ends at a predetermined rise angle in a same direction as said flow tubes;

wherein a change of flow paths from the two flow tubes to external piping is addressed by flow paths in the manifolds being smoothly bent from an inlet of said entry-side manifold and an outlet of said exit-side manifold to the ~~joints~~joint ends connecting to said two flow tubes~~, and connected to said flow tubes at said joints at a predetermined rise angle in the same direction as said flow tubes.~~

Please amend Claim 3 as follows:

3. (Amended) A Coriolis mass flow meter as set forth in claim 1 wherein:

a pressure-resistant case is arranged around said two flow tubes;

said entry-side and exit-side manifolds have a pair of integrally formed disc-shaped flanges, to which both ends of said pressure-resistant case are fixedly fitted;-

the cross-sectional shape of said pressure-resistant case being an oval shape with the major axis oriented in the curved direction of said flow tubes, with the length of said major axis smoothly and gradually reduced from the axial central part thereof to both ends thereof into a substantially circular shape over a predetermined length near both ends.